

## A NEW SPECIES OF HYLID FROG FROM THE NORTHERN TERRITORY

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### Summary

TYLER, M. J., DAVIES, M. & MARTIN, A. A. (1978) A new species of hylid frog from the Northern Territory. *Trans. R. Soc. S. Aust.* **102**(6), 151-157, 31 August 1978.

A new species of hylid frog *Litoria personata* is described from the East Alligator Region of the Northern Territory, Australia. External morphology and features of cranial and post-cranial anatomy indicate a relationship to the *Litoria latopalmata* and *L. nigrofrenata* species groups. The species lives at the perimeter of the rock escarpment, and breeds in temporary rock pools. The tadpole is noteworthy for the spectacular gold stripes along its body and tail.

### Introduction

Although frogs of the family Hylidae are popularly termed tree-frogs, numerous species are wholly or predominantly terrestrial, or else are scansorial in non-arboreal situations such as upon exposed rock faces. In Australia members of the *Litoria latopalmata*, *L. nasuta* and *L. nigrofrenata* species groups are good examples of terrestrial species. All have rather elongate bodies, unwebbed fingers, variably webbed toes and relatively long hindlimbs.

The terrestrial species occur only in eastern and northern Australia. One (*L. latopalmata* (Günther)) extends into arid parts of western Queensland and New South Wales, and recently has been collected in the extreme northeast of South Australia (Tyler 1977).

There remains considerable uncertainty about the number of species in the *L. latopalmata* group as defined by Tyler & Davies (1978). The three named species differ only slightly in colouration and in the few morphological features recognised to be significant. Biological data are inadequate to permit clarification of the taxonomic status to be accorded to some populations. Similarly the phylogenetic relationship existing between this and other species groups has yet to be resolved.

As a result of the collecting activities of Mr Greg Miles of the N.T. National Parks and Wildlife Commission, we were able to examine

in 1977 specimens of an undescribed species of *Litoria* from the East Alligator River region of the N.T. It bears a resemblance to members of the *L. latopalmata* and *L. nigrofrenata* species groups. Subsequently Davies, Miles, and Tyler obtained a further adult specimen in November 1977, Miles and Tyler collected tadpoles and recently metamorphosed young frogs in April 1978, and Miles and I. Morris collected more adults and recently metamorphosed individuals in May 1978.

Here we describe the new species and discuss its phylogenetic relationships.

### Material and methods

The specimens reported here are deposited in institutions abbreviated in the text as follows:

Northern Territory Museum, Alice Springs (NTM)

South Australian Museum, Adelaide (SAM)

Methods of measurement follow Tyler (1968a) and osteological comparisons are those adopted by Davies (1978). Tadpoles were fixed in Tyler's (1962) fixative and staged according to Gosner (1960).

### *Litoria personata* sp. nov.

FIGS 1-6

*Holotype*: SAM R.16773. A gravid female collected at Birndu (12°32'S; 132°8'E), south-east of Cannon Hill Station, East Alligator

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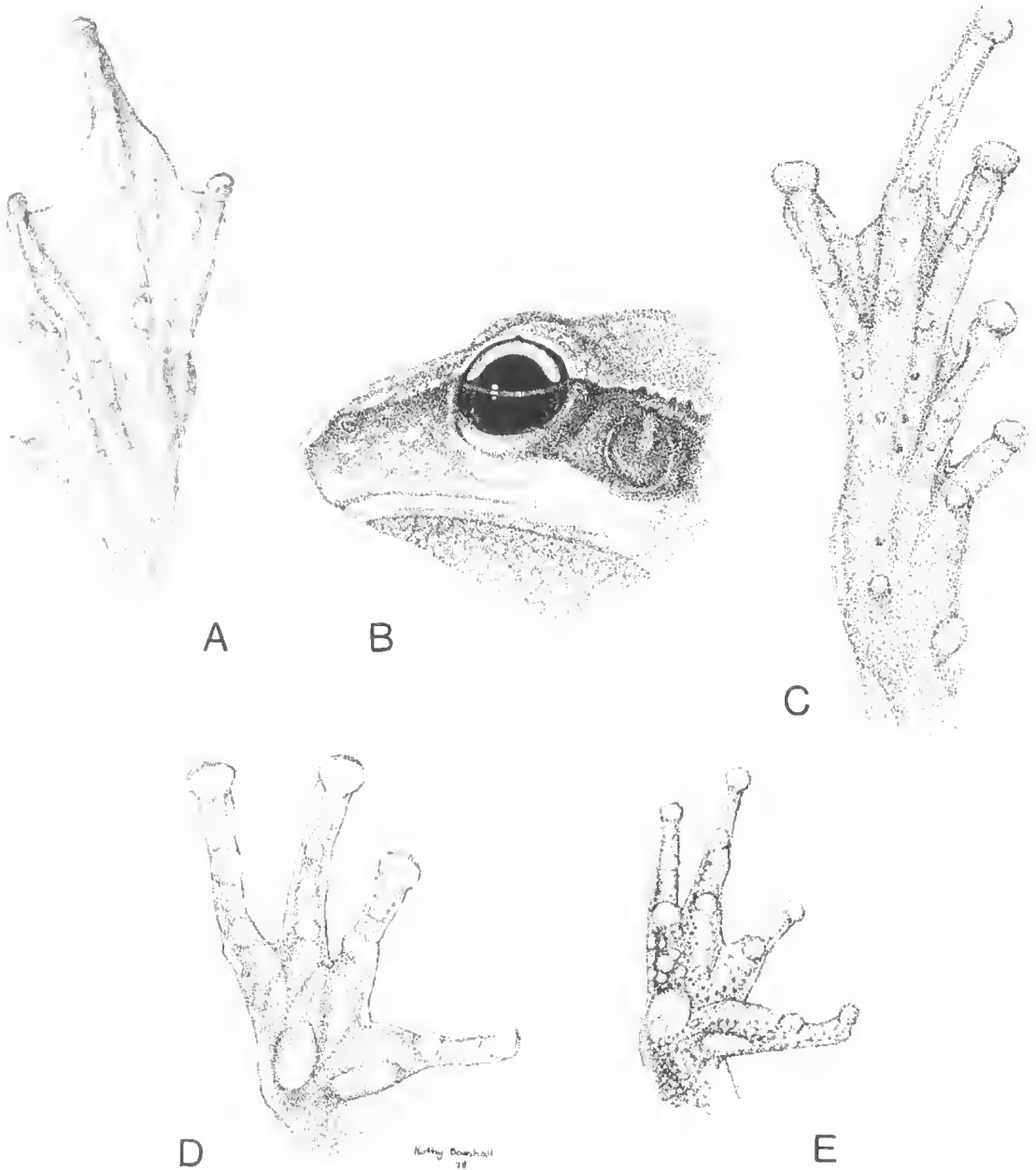


Fig. 1. A. Plantar surface of foot of *Litoria wotjulumensis* SAM R.16857; B. Lateral surface of head of *L. personata*; C. Plantar surface of foot of *L. personata*; D. Palmar surface of hand of *L. personata*; E. Palmar surface of hand *L. torneri* SAM R.16779.

River Region, Northern Territory, by M. Davies, G. Miles, and M. J. Tyler on 27.xi.1977.

**Definition:** A small rock-dwelling species (female 32.8 mm; males 28.8–28.9 mm S-V length), characterised by its unwebbed fingers with distinctly expanded terminal discs, first

finger longer than second; moderately long hindlimbs (TL/S-V 0.51–0.60); broad, dark stripe on the side of the head; tadpole with striking, dorsolateral gold or yellow stripes on the body and tail.

**Description of holotype:** Head longer than broad (HL/HW 1.15); head length more than

one third of the snout to vent length (HL/S-V 0.37). Snout prominent, projecting in profile and slightly rounded when viewed from above and in profile (Fig. 1B). Nostrils more lateral than superior, their distance from end of snout two-thirds that from eye. Distance between eye and naris less than inter-narial span (E-N/IN 0.86). Canthus rostralis slightly defined and straight, its nature accentuated by dark rostral stripe. Eye relatively small and inconspicuous, its diameter equivalent to eye to naris distance. Tympanum completely visible; diameter slightly more than two-thirds eye diameter (Fig. 1B).

Vomerine teeth on short, oval elevations between anterior edges of choanae. Tongue broadly oval.

Fingers long and slender, lacking lateral fringes (Fig. 1D); in decreasing order of length  $3 > 4 > 2 > 1$ . No webbing between fingers. Terminal discs moderately well developed, extending laterally beyond lateral edges of penultimate phalanx. Subarticular and palmar tubercles prominent.

Hind limbs long (TL/S-V 0.59). Toes in decreasing order of length  $4 > 5 > 3 > 2 > 1$  (Fig. 1C). Webbing reaching half-way up penultimate phalanx on toe 5 and below sub-articular tubercle at base of antepenultimate phalanx of toe 4. Subarticulate tubercles prominent. Small oval inner and smaller rounded outer metatarsal tubercles.

Dorsum very finely tubercular; abdomen, pectoral region and undersurface of thighs coarsely granular; submandibular area smooth. Slightly developed tarsal fold, but no supratympanic fold.

In preservative palc grey with a conspicuous, very dark stripe extending from nostril to eye, and posteriorly to above insertion of forearm (Fig. 2). A narrow white stripe from lower margin of eye to posterior extremity of mandible. Ventral surface pale cream.

In life background colouration similarly grey or pale brown. Ova, viewed through a transparent portion of body wall, small and unpigmented.

*Dimensions of holotype:* S-V 32.8 mm; TL 15.9 mm; HL 10.3 mm; HW 9.1 mm; E-N 2.7 mm; IN 3.2 mm; E 3.5 mm; T 2.3 mm.

*Etymology:* The specific name is derived from the Latin, *personatus*, masked, in reference to the dark stripe through the eye.

#### Variation

There are twelve paratypes: SAM R.16774, an adult male collected as a recently metamorphosed juvenile on Cannon Hill Station, N.T. by G. Miles in August 1977. This specimen was reared at the University of Adelaide, and preserved in alcohol when it reached adulthood; SAM R.16775, a sub-adult male collected with the preceding specimen; died in captivity; SAM R.16776 (cleared and stained),

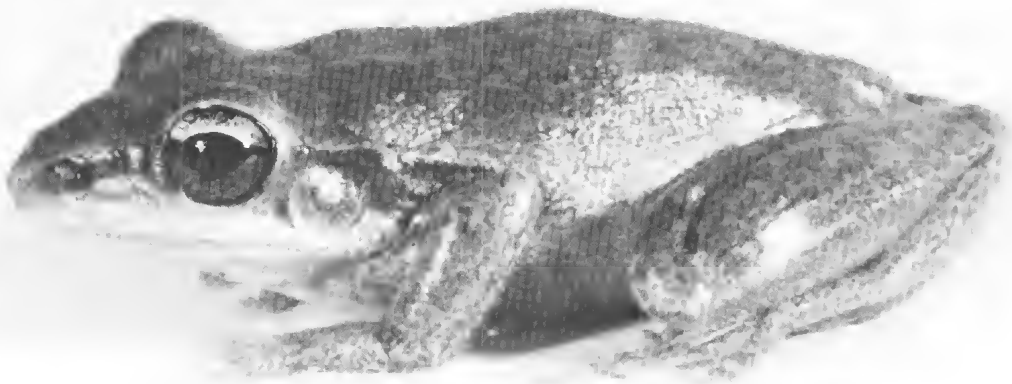


Fig. 2. Live *Litoria personata*. Paratype SAM R.16774.

an adult male, Bradshaw Ck, Cannon Hill, G. Miles, 2.ii.1977; NTM A.123-125, juveniles, G. Miles, 1.ii.1977; SAM R.16829, 16855-56, metamorphosing juveniles, Cannon Hill, G. Miles and M. J. Tyler, 26.iv.1978; SAM R.16830-32, adults and juveniles from Birndu, G. Miles and I. Morris, 20.v.1978.

The adult males measure 28.8 and 28.9 mm S-V respectively, and the females 30.6 and 32.2 mm. The cleared and stained specimen had very large pigmented nuptial pads on the first finger. The other specimen lacks nuptial pads, but possesses a submandibular vocal sac. The head is elongate and the snout prominent and tapering in both specimens.

Hind limb length is highly variable, and proportionately less than or greater than that of the holotype (TL/S-V 0.51-0.60 in the adult and sub-adult paratypes).

Six of the juveniles exhibit the adult pattern of markings; the seventh is in a state of transition, exhibiting traces of the conspicuous pale stripes that characterise the tadpole of this species (described below).

#### Larval morphology

Five larvae collected at Cannon Hill on 1.ii.77 are in stages 27-41; their total length ranges from 23.7 to 44.1 mm and their body length from 10.3 to 16.7 mm. Six larvae collected on 26.iv.78 are more advanced, including specimens at stages 41-45. Their total length ranges from 41.8 to 55.1 mm and their body length from 16.6 to 18.6 mm. Fig. 3A shows a larva at stage 41. Dimensions of this individual are: total length, 52.9 mm; body length, 18.6 mm; maximum body width, 9.0 mm; maximum body depth, 7.5 mm; maximum tail depth (including fin), 8.6 mm.

The mouth is subterminal and the anus opens to the right of the tail fin. The eyes are lateral. The spiracle is sinistral and ventrolateral; it is not visible in a dorsal view of the larva. In its general body form the larva resembles those of other Australian ground hylids from lotic habitats, e.g. *L. lesueuri* (Martin 1967). The body is flattened and the tail fin is narrow, while the tail musculature is powerful. The mouth structure is also typical of Australian hylid larvae which live in flowing water; there are two upper and three lower rows of labial teeth, and the papillary border is complete. The horny jaws are relatively weakly developed (Fig. 3B).

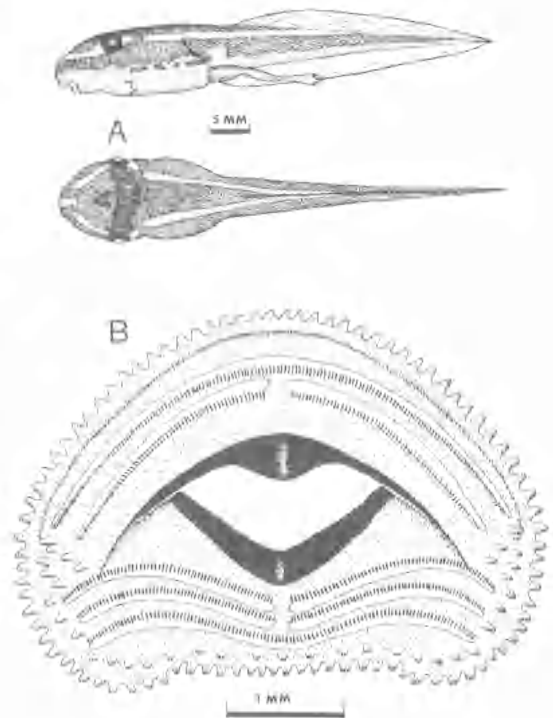


Fig. 3. A. Left lateral and dorsal views of larva of *Litoria personata* at stage 41; B. Mouth disc of larva of *L. personata* at stage 31.

In life larvae are dark brown on the dorsal surface and creamy white beneath. The dorsolateral stripes are gold to yellow. In preservative the dorsal ground colour is greyish-brown. There is an irregular dark grey transverse band between the eyes, and in front of this band there is an arrowhead-shaped dark grey patch. The dorsolateral stripes and the ventral part of the body and tail are creamy white. The tadpole's striking appearance stems from the dorsolateral stripe, and from the abrupt transition from dark to light pigmentation along the lateral midline.

Unfortunately the larval morphology of other members of the *L. latopalmata* complex has not been described; hence whether or not this spectacular appearance is diagnostic of the larva of *L. personata* is unknown.

#### Comparison with other species

(a) *External morphology*: The elongate body form, projecting snout, relatively long hind limbs, unwebbed fingers and poorly webbed toes are a combination of features exhibited by all terrestrial *Litoria*. The extreme of these

adaptations is demonstrated by members of the *L. nasuta* group in which the elongation of head, body and limbs is most pronounced.

In northern Australia the *L. nasuta* species group is represented by *L. nasuta*. This species has longer hind limbs than *L. personata* (TL/S-V 0.64–0.78 in *L. nasuta*; 0.51–0.59 in *L. personata*). The head of *L. nasuta* is proportionately much longer (HL/HW 1.21–1.43 in *L. nasuta*; 1.13–1.17 in *L. personata*). The two species also differ in skin texture: very finely tubercular in *L. personata*; with numerous, longitudinally arranged plicae in *L. nasuta*.

The sympatric species *L. tornieri* of the *L. latopalmata* species group lacks the finger discs of *L. personata* (Fig. 1E) and has a disrupted lateral head stripe; the stripe is continuous in *L. personata*. The new species may also be slightly smaller than *L. tornieri*: S-V of the female *L. personata* are 30.6–32.8 mm, whereas the range in *L. tornieri* is 31.1–39.7 mm. The S-V of male *L. personata* (28.8–28.9 mm) is in the middle of the *L. tornieri* range (26.1–32.1 mm).

The habitus, finger discs and proportions indicate a close relationship between *L. personata* and *L. wotjulumensis* of the *L. nigrofrenata* species group. They differ principally in size and colour: *L. wotjulumensis* is considerably larger (males 33.8–37.7 mm; females 45.7–54.1 mm, Tyler 1968b and unpublished data) has fully webbed toes (Fig. 1A) and often is infused with lemon yellow on the abdomen, flanks and undersurface of the lower limbs.

(b) *Osteology*: Provisional comparisons suggested that the closest relative of *L. personata* is *L. wotjulumensis*, whose skull is illustrated by Tyler & Davies (1978). Dorsal, lateral and ventral views of the skull of *L. personata* are shown in Fig. 4.

In both species the skull is longer than broad, and the slightly elongate snout is rounded terminally in dorsal aspects. The nasals are moderately-sized, narrow, bones very widely separated medially by the sphenethmoid; they do not articulate with it. The sphenethmoid is double and moderately to well ossified; it projects between but not beyond the nasals.

There is minor variation in the form of the frontoparietals. They are moderately ossified, lack anterior contact with the nasals and do not overlap the crista parotica posteriorly in

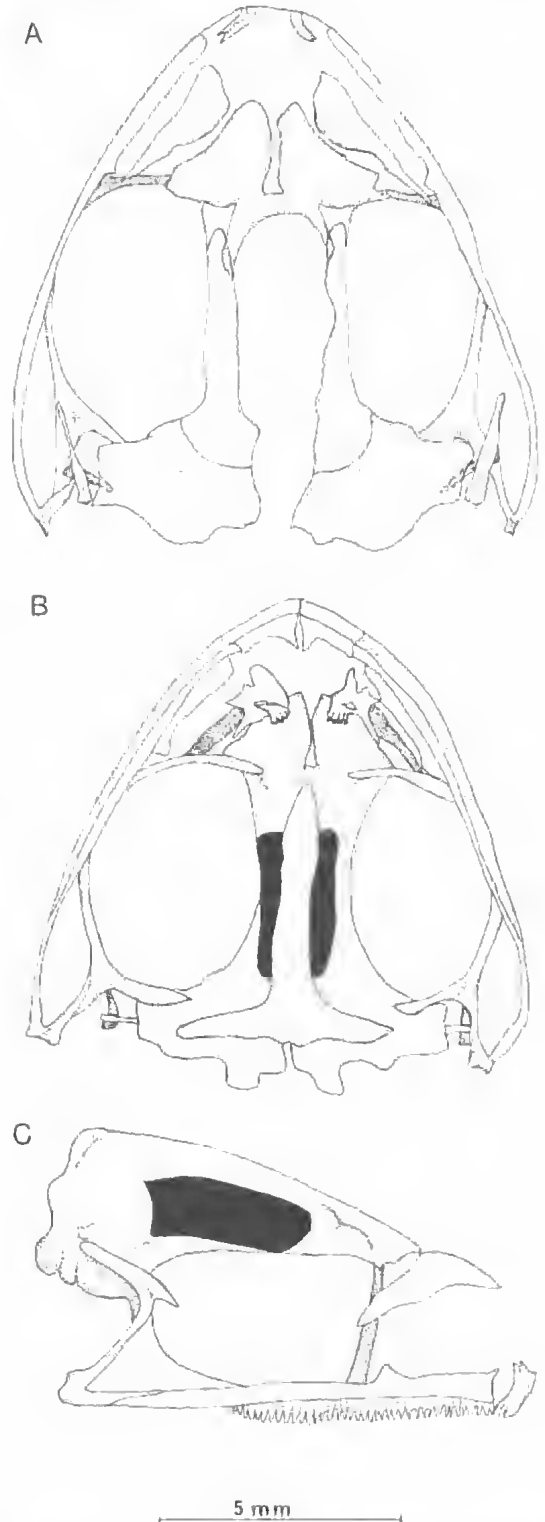


Fig. 4. Skull of *Litoria personata*. Paratype SAM R.16776. A. Dorsal view; B. Lateral view; C. Ventral view.

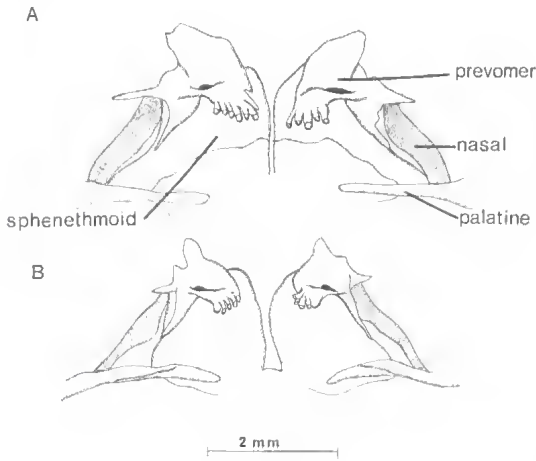


Fig. 5. Prevomers. A. *Litoria wotjulumensis*; B. *L. personata*.

both species. However, there is a slight postero-medial articulation in *L. wotjulumensis*, but not in *L. personata*. The frontoparietal fontanelle is large in both species and is continuous posteriorly in *L. personata*.

The crista parotica are moderately short and broad with prominent epiotic eminences, and

the otic rami of the squamosals do not overlap the crista parotica. In *L. personata* this ramus is clearly separated from the crista parotica, whereas in *L. wotjulumensis* the relationship of these bones is more intimate. The short zygomatic ramus of the squamosals is longer than the otic ramus in *L. personata* whilst in *L. wotjulumensis* the arms are of approximately equal length.

The pterygoid is well developed and the median ramus is in bony contact with the prootic. The quadratojugal is well developed.

The pars facialis of the maxillary is shallow; the well-developed posterior process reaches the level of the maxillary process of the nasal in *L. personata*, but in neither species does it make bony contact. The alary processes of the premaxillaries are broad at the base, widely separated medially, and curve posteriorly after an initial vertical section. The palatine processes of the premaxillaries are well developed and do not abut medially or at their extremities.

The prevomers are reduced medially, widely separated, and have short horizontal denticerous processes (Fig. 5). The palatines are short and narrow.



Fig. 6. Type locality of *Litoria personata*: Escarpment at Birndu, N.T.

The cultriform process of the parasphenoid is extremely long and narrow; the alae are also long and narrow and are at right angles to the cultriform processes.

In the post-cranial skeleton the sacral diapophyses are broadly expanded in *L. personata* and moderately to broadly expanded in *L. wotjulumensis*. There is a flange on the distal head of the third metacarpal, and the intercalary structures are ossified in both species.

#### Habitat

The holotype was collected at night upon a flat shelf on an open rock face at the foot of the Arnhem Land escarpment; the type locality is shown in Fig. 6. Tadpoles and metamorphosing juveniles were taken in or around temporary pools upon the escarpment or at its foot. The area supported a 'Mixed Scrub' community (Story 1969) composed mainly of

evergreen non-eucalypts, with *Pandanus* and shrubs rising to approximately 8 m; overall visibility is approximately 20 m.

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